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FLOOD FIGHT TECHNIQUES WORKSHOP HELD IN NEW ORLEANS  
LOUISIANA ON 9-11 DEC. (U) COASTAL ENGINEERING RESEARCH  
CENTER VICKSBURG MS D D DAVIDSON ET AL. NOV 87  
CERC-MP-87-17

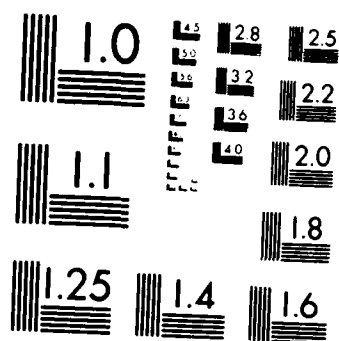
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MISCELLANEOUS PAPER CERC-87-17

**FLOOD FIGHT TECHNIQUES WORKSHOP  
9-11 DECEMBER 1986  
NEW ORLEANS, LOUISIANA**

by

**Edward J. Hecker**

**US Army Corps of Engineers, Emergency Operations Section  
Emergency Management Branch, Washington, DC 20314-1000**

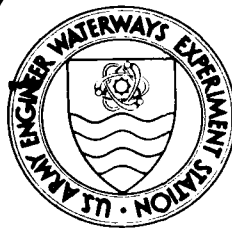
and

**D. D. Davidson, Dennis G. Markle**

**Coastal Engineering Research Center**

**DEPARTMENT OF THE ARMY  
Waterways Experiment Station, Corps of Engineers  
PO Box 631, Vicksburg, Mississippi 39180-0631**

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**November 1987  
Final Report**

**Approved For Public Release; Distribution Unlimited**

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**Prepared for DEPARTMENT OF THE ARMY  
US Army Corps of Engineers  
Emergency Management Branch  
Washington, DC 20314-1000**

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FIELD	GROUP	SUB-GROUP	Construction Levees Structures		
			Emergency Modeling		
			Flood Fighting Operations		
19. ABSTRACT (Continue on reverse if necessary and identify by block number) The workshop was developed and carried out with the following targeted objectives:  a. Present and evaluate the results of research and development conducted to date at WES and discuss areas where additional research and development are needed.  b. Discuss and evaluate technology transfer tools as they currently exist and are being used and determine where additional needs exist.  c. Discuss emergency operation training as it currently exists and determine where and what types of additional training are needed.  d. Provide a forum for exchange of ideas and experiences between field personnel from various disciplines of research and emergency operations. (Continued)					
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19. ABSTRACT (Concluded).

It was concluded that a significant amount of information exists on the performance and design of expedient flood fight structures and other Emergency Management concerns, but it lacks a centralized organization and distribution point and that a general research and development program is seriously needed to provide the authority and funding required to:

- a. Collect, consolidate, and disseminate to the divisions and districts the information that currently exists on Emergency Management concerns.
- b. Conduct additional and extended research on design, construction, life, performance, operation, and maintenance of emergency flood fight structures under a range of environmental conditions.
- c. Develop effective technology transfer tools needed to distribute and explain Emergency Management information that has been developed through research or extracted from existing sources.
- d. Develop and carry out training (workshops, videos, seminars, etc.) needed to promote exchange of ideas and field experience, distribute new and existing information to field personnel, provide training to new personnel, and develop a method through which the research and development community, having become aware of major field problems, can provide assistance.

## PREFACE

A workshop entitled "Emergency Flood Fight Techniques" was held 9-11 December 1986 at New Orleans, LA. The workshop was sponsored and funded through the Emergency Management Branch, Operations and Readiness Division, Office, Chief of Engineers (OCE). The workshop was developed and organized by Messrs. Edward J. Hecker and Brian Mulvenna, OCE, with the assistance of Messrs. Dennis G. Markle and D. D. Davidson, Wave Dynamics Division (CW), Coastal Engineering Research Center (CERC), US Army Engineer Waterways Experiment Station (WES). Mr. Jerry Colletti, US Army Engineer District, New Orleans, and his staff made arrangements for the conference room and provided assistance throughout the workshop.

This report was prepared by Messrs. Hecker, Davidson, and Markle at CERC under direct supervision of Mr. C. Eugene Chatham, Chief, CW; and under general supervision of Dr. James R. Houston and Mr. Charles C. Calhoun, Jr., Chief and Assistant Chief, CERC, respectively.

Commander and Director of WES during publication of this report was COL Dwayne G. Lee, CE; Technical Director was Dr. Robert W. Whalin.



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## CONTENTS

	<u>Page</u>
PREFACE. . . . .	1
PART I: OVERVIEW. . . . .	3
Background . . . . .	3
Workshop Objectives . . . . .	3
Synopsis . . . . .	3
PART II: DISCUSSION . . . . .	5
Research and Development . . . . .	5
Technology Transfer . . . . .	5
Training . . . . .	6
PART III: CONCLUSIONS AND RECOMMENDATION. . . . .	7
ACKNOWLEDGMENT . . . . .	8
APPENDIX A . . . . .	A1
APPENDIX B . . . . .	B1
APPENDIX C . . . . .	C1



## PART I: OVERVIEW

### Background

1. During times when high waters threaten to flood private and/or public property, the U.S. Army Corps of Engineers is authorized to provide both the technical and emergency construction assistance required to supplement State and local efforts to minimize damages. Through research and development, training and hands on applications the Corps of Engineers has developed a vast knowledge of Emergency Management skills and flood fighting techniques. These skills and techniques are of a wide and diversified nature dependent upon the area of the country and the type of flooding problems being addressed.

### Workshop Objectives

2. The workshop was developed and carried out with the following targeted objectives:

- a. Present and evaluate the results of research and development conducted to date at WES and discuss areas where additional R&D are needed.
- b. Discuss and evaluate technology transfer tools as they currently exist and are being used and determine where additional needs exist.
- c. Discuss emergency operation training as it currently exists and determine where and what types of additional training are needed.
- d. Provide a forum for exchange of ideas and experiences between field personnel from various disciplines of research and emergency operations.

### Synopsis

3. With the preceeding list of objectives in mind, the workshop agendas, Appendix A, were developed. Two back-to-back day- and a-half workshop sessions were conducted in order to allow opportunity for attendance by all Corps of Engineer Divisions and Districts and still keep session sizes down to a level that would permit informal exchange between attendees. Ninety-one

individuals representing ten Corps of Engineer Divisions, OCE, and WES attended the workshop (see List of Attendees, Appendix B).

4. Each workshop session was opened by Mr. E. J. Hecker, OCE. Mr. D. D. Davidson, WES, presented a test result summary on expedient flood fight structures R&D recently completed by WES. A handout, in excess of 100 pages, covering the WES R&D work on expedient levee raising structures was given to workshop attendees and a limited supply is available and can be furnished upon request to Mr. Dennis G. Markle, at U.S. Army Engineer Waterways Experiment Station, P.O. Box 631, Vicksburg, MS 39180. A draft report on all the WES expedient structure R&D has been prepared, but publication funds are not available through the IOMT program under which the tests were originally authorized and funded. Messrs. N. R. Oswalt and M. B. Boyd, WES, presented brief summaries of the WES Hydraulics Laboratory physical and numerical model capabilities, respectively. Examples of existing physical and mathematical models were given as tools for technical assistance to Field Offices within the Corps. The Mississippi Basin Model, the Old River Structures, the new Riprap Test Facility, and the Red River Projects are some of the existing physical models described as available. Short term manpower and equipment are available to obtain prototype measurements of vibrations, flow rates, distribution of flow, scour detection, and other flow related data. Messrs. Don Garrett and Jerry Kanenaga, U.S. Army Engineer District, Sacramento, and Mr. Tim Monteen, U.S. Army Engineer Division, North Central, presented overviews of emergency operations and flood fight techniques used in their respective parts of the country. Mr. C. R. Scott, U.S. Army Engineer District, Vicksburg, demonstrated and gave a brief history on development and usage of the District's scale model of emergency flood fight structures. Outlines of Messrs. Garrett's, Kanenaga's, Monteen's, and Scott's presentations are provided in Appendix C.

5. Following the presentations the attendees broke into three work groups. Each group was assigned one of the following topics to discuss and develop recommendations:

- a. Research and Development
- b. Technology Transfer
- c. Training Needs

After reconvening and discussing work group findings, a vendor demonstrated his flood fight system concept. Closing comments were made by Mr. Hecker and the workshop was adjourned.

## PART II: DISCUSSION

### Research and Development

6. General research on emergency management and flood fighting techniques is limited in most areas of emergency operations and practically nonexistent in others. Individual Districts and Divisions have had various experiences and this information should be documented, compiled, and disseminated throughout all Field Offices so existing field experiences, both successful and unsuccessful, can be used advantageously.

7. The research conducted to date at WES on expedient levee raising structures provides basic data on the relative performance of most of the existing and commonly used expedient flood fight structures. Although limited by test restraints these data provide a good foundation on which additional research needs to be conducted to address the following items:

- a. Controlled testings should address, to the best extent possible, "real world" loading effects of flow, with and without debris, high amplitude waves, varying soil types, structure curves and elevation variations and/or scour of existing levee on the stability of existing and new levee raising structure concepts.
- b. Develop an information package on various structures which addresses performance (based on tests or actual field data), construction time, logistics for real world construction, manpower and equipment requirements, constructability, quality control, structure life and operation and maintenance (O&M) procedures.
- c. Conduct large scale field tests of most promising existing and/or new levee raising structure concepts.

### Technology Transfer

8. The following items were listed as major needs to improve technology transfer:

- a. Division and District personnel need designated points of contact in OCE and Laboratories that can provide assistance and/or guidance.
- b. Need to determine the best mechanisms to get performance and design data to field personnel; i.e. manuals, ETL's, training programs, etc.

- c. There is a need for a research and development program not only to study and advance all phases of emergency management and operations but which can be used as a vehicle to develop, promote and fund sound technology transfer tools needed to disseminate existing as well as newly developed information on emergency management and emergency structures design and performance criteria.
- d. OCE needs to assemble and distribute existing District guidance and information available on Emergency Operations, after screening for Corps-wide applications. An inventory of available manuals, etc. should be produced.
- e. Expansion of Laboratory capabilities to assist emergency managers during flood fight operations. There is a need to communicate the R&D needs of the emergency management program to all labs and establish an appropriate forum for program exchanges.

#### Training

9. The participants concluded that it was very beneficial to conduct emergency management workshops and seminars which involve representatives from all functional elements involved in a given program activity. The focus on a specific activity such as flood fight operations provides an opportunity to present and discuss specific problem areas, policies and procedures, and recommended solutions. The training needs identified included:

- a. HQUSACE develop standardized slide presentations.
- b. Live demonstrations/combined with flood fight exercises.
- c. Standardized videotapes.
- d. Other simulations.
- e. Educational brochures/EP's.
- f. Develop USACE inventory of existing slide presentations/videos, etc.
- g. Lessons learned as a training vehicle.
- h. Uses of LMK flood fight model.
- i. Additional training seminars and workshops on selected topics.
- j. Potential use of teleconference technology.

### PART III: CONCLUSIONS AND RECOMMENDATION

10. A significant amount of information exists on the performance and design of expedient flood fight structures and other Emergency Management concerns, but it lacks a centralized organization and distribution point. A general research and development program is urgently needed to provide the authority and funding required to:

- a. Collect, consolidate and disseminate to the Divisions and Districts the information that currently exists on Emergency Management concerns.
- b. Conduct additional and extended research on design, construction, life, performance, operation and maintenance of emergency flood fight structures under a range of environmental conditions.
- c. Develop effective technology transfer tools needed to distribute and explain Emergency Management information that has been developed through research or extracted from existing sources.
- d. Develop and carry out training (workshops, videos, seminars, etc.) needed to promote exchange of ideas and field experience, distribute new and existing information to field personnel, provide training to new personnel and provide a method through which the research and development community can be trained on where major field problems exist that R&D could provide positive help.

11. Without implementation of a R&D program that can serve as a vehicle to accomplish the above items, R&D will continue to be carried out sporadically as needs arise and funding can be found and will not effectively meet the needs of the emergency manager. Also, without the necessary authority and funding, a well balanced program of technology transfer and training will continue to be an item that is talked about but not implemented.

#### ACKNOWLEDGMENT

12. Thanks are expressed to all those who participated in the workshops and contributed to the discussions. Special recognition goes to all of the presentors who had a formal part on the agenda and to Mr. Al Betancourt, New Orleans District, for his voluntary discussion on sandbag specifications and field experience. Mr. Jerry Colletti and other participating LMNOD-E staff are commended for their efforts in setting up the conference room and providing the excellent visual aids.

## APPENDIX A: SESSION AGENDAS

### FLOOD FIGHT TECHNIQUES WORKSHOP

#### SESSION I AGENDA

9-10 December 1986

#### 9 DECEMBER 1986

Day 1	0800	Registration	
	0830	Welcome & Introduction	WES/HQUSACE
	0845	Opening Remarks	DAEN-CWO-EO (Ed Hecker)
	0900	R&D Test Results	WESCW-R (Dennis Markle) (D. D. Davidson)
	0945	Break	
	1000	R&D Test Results (Cont'd)	
	1100	Break	
	1115	WES Hydraulic Lab Capabilities & Overview of Results of Section 32 Program	WESHS-F (Randy Oswalt) WESHP (Burton Boyd)
	1200	Lunch	
	1300	Field Presentations & Discussions :	
		a. SPK - Sacramento River & Great Salt Lake Experience	Don Garrett/Jerry Kanenaga
		b. NCD - Great Lakes Experience	Tim Monteen
		c. LMK - Demonstration of Flood Fight Model	Clyde Scott
	1500	Break	
	1515	Workshop Objectives	WES/HQUSACE
	1530	Separate Workshop Discussion	
	1645	Reconvene for Day 1 Wrap-Up	
	1700	Adjourn	

10 DECEMBER 1986

Day 2	0800	Administrative Remarks	CWO-EO
	0815	Reconvene Working Groups	
	0930	Workshop Recommendations and Discussion	
	1100	Presentation/Demonstration by JGJ Enterprises of Flood Fight System Invention	James Jackson
	1130	Summary & Closing Remarks	WES/HQUSACE
	1200	Adjourn	

PROPOSED WORKSHOP TOPICS:

a. Research and Development: Identify additional R&D needs for application to Corps emergency response. Specifically address the need for additional R&D on expedient flood fight structures. Flood warning techniques may also be discussed.

b. Technology Transfer: Identify areas where completed R&D may be applied, or where labs capabilities may be more fully applied to assist emergency operations. ER 500-I-20 may serve as a basis for this discussion. Identify Pilot Programs w/POC.

c. Training Needs: Identify the training needs for both Corps and local interests to respond effectively to flood emergencies. This may include development of videotapes, uses of the LMK flood fight model, and development of training guides or manuals.



## FLOOD FIGHT TECHNIQUES WORKSHOP

### SESSION 2 AGENDA

10-11 December 1986

#### 10 DECEMBER 1986

Day 1	1300	Registration	
	1330	Welcome & Introduction	WES/HQUSACE
	1345	Opening Remarks	DAEN-CWO-EO (Ed Hecker)
	1400	R&D Test Results	WESCW-R (Dennis Markle) (D. D. Davidson)
	1445	Break	
	1500	R&D Test Results (Cont'd)	
	1600	WES Hydraulic Lab Capabilities & Overview of Results of Section 32 Program	WESHS-F (Randy Oswalt) WESHP (Burton Boyd)
	1700	Adjourn	

#### 11 DECEMBER 1986

Day 2	0800	Administrative Remarks	WES/HQUSACE
	0830	Field Presentations & Discussions:	
		a. SPK - Sacramento River & Great Salt Lake Experience	Don Garrett/Jerry Kanenaga
		b. NCD - Great Lakes Experience	Tim Monteen
		c. LMK - Demonstration of Flood Fight Model	Clyde Scott
	1030	Break	
	1045	Workshop Objectives	WES/HQUSACE
	1100	Separate Workshop Discussion	
	1200	Lunch	
	1330	Reconvene Working Groups	

1430	Workshop Recommendations and Discussion	
1530	Presentation/Demonstration by JGJ Enterprises of Flood Fight System Invention	James Jackson
1630	Summary & Closing Remarks	WES/HQUSACE
1700	Adjourn	

PROPOSED WORKSHOP TOPICS:

a. Research and Development: Identify additional R&D needs for application to Corps emergency response. Specifically address the need for additional R&D on expedient flood fight structures. Flood warning techniques may also be discussed.

b. Technology Transfer: Identify areas where completed R&D may be applied, or where labs capabilities may be more fully applied to assist emergency operations. ER 500-I-20 may serve as a basis for this discussion. Identify Pilot Programs w/POC.

c. Training Needs: Identify the training needs for both Corps and local interests to respond effectively to flood emergencies. This may include development of videotapes, uses of the LMK flood fight model, and development of training guides or manuals.

APPENDIX B: ATTENDEES  
SESSION 1

WORKSHOP ON EXPEDIENT FLOOD FIGHT STRUCTURES AND TECHNIQUES

NEW ORLEANS, LOUISIANA

DECEMBER 9 - 11, 1986

NAME	TELEPHONE #	DIVISION
Tom Rosato	(617) 647-8272	NED
Jack Caffrey	(617) 894-8785	"
Martin McCleary	(612) 725-5882	
Robert T. Riebe	(309) 788-6361	NCD Rock Island
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Mike O'Bryan	(313) 226-5789	NCD, Detroit
Noel Randy Oswald	(601) 542-3895	WESHS
D. D. Davidson	(601) 634-2722	WESCW-R
M. B. Boyd	(601) 542-3293	WESHP
E. C. "Rusty" Culton	(817) 334-4154	SWD, Ft. Worth
Bill Horry	(918) 581-7312	SWD, Tulsa
Ed Chapman	(501) 378-5695	SWD, Little Rock
Albert J. (Al) Dunn	(615) 736-7037	ORD
Harold E. Frankel	(502) 582-5931	ORD, Louisville
Oscar Krosnes	(573) 684-3089	ORD
Don Frank	(502) 582-5931	ORD, Louisville
Ronald W. Edward	(912) 944-5431	SAD, Savannah
Ronald A. Moore	242-6792	SAD
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Gregg M. Griffith	(919) 343-4697	SAD
Richard Lambey	(509) 522-6488	NPD
Gordon Taxer	(503) 294-5241	NPD
David Brown	(503) 221-6489	NPD
JERRY COLLETTI	(504) 862-2353	LMVD
Colette DUFFOUR	(504) 862-1275	LMVD

WORKSHOP ON EXPEDIENT FLOOD FIGHT STRUCTURES AND TECHNIQUES

NEW ORLEANS, LOUISIANA

DECEMBER 9 - 11, 1986

NAME	TELEPHONE #	DIVISION
Sam Powell	(202) 272-9501	CCE
Bryan Mulvenix	(202) 272-0251	"
Ed Hecker	"	"
Herman H. (Bud) Puhl, III	FTS 460-2049 COM (916) 551-2049	SPD
Jerry Kanenaga	(916) 551-2539	"
Richard Dinkelman	(213) 798-3440	"
Theresa Mendoza	FTS 454-7066	"
Eric Behn	FTS 454-7066	"
Ben F. Venturella, Jr.	(314) 263-5301	LMS
Bill Waldrop	(601) 634-7170	LMK
Clyde R. Scott	(601) 634-5015	LMK
A. Betancourt	(504) 862-2244	LMN
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John Bertino	(402) 221-4492	MRO
Douglas A. Strahbehn	864-7216	MRD
Red Harris	864-4148	MRO
Curt Musgrave	864-7218	MRD
Gerald W. Adams	(864) 374-6135 FTS 758-6135	MRK
Richard F. Nolella	(215) 597-0703	NAP
Moldecai Bennett	(301) 962-2013	NAB
Paul Dobie	(804) 441-3631	NAB
George A. Beyels	(212) 264-0163	NAN

SESSION 2  
 WORKSHOP ON EXPEDIENT FLOOD FIGHT STRUCTURES AND TECHNIQUES  
 NEW ORLEANS, LOUISIANA  
 DECEMBER 9 - 11, 1986

NAME	TELEPHONE #	DIVISION
FRANK COLLINS	505-766-3829	SWD/SWA
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WILLIAM FULLER	205-690-2495	SAD/SAM
LEO LAVINKA	404-331-6792	SAD
JACK HURDLE	901-521-3461	LMVD/LMM
DON CLEMENT	504-862-2358	LMVD/LMN
JERRY COLLETTI	504-862-2353	LMVD/LMN
CULETTE DUFFOUR	504-862-1275	LMVD/LMN
JOHN O'BRIEN	504-862-2345	LMVD/LMN
AL BETANCOURT	504-862-2244	LMVD/LMN
JERRY SMITH	601-634-7304	LMVD
FRANK STUBBS	601-634-7302	LMVD
GERALD NEAL	601-634-7308	LMVD
JOHN ASHLEY	601-634-7161	LMVD/LMK
CLYDE SCOTT	601-634-7161	LMVD/LMK
BILL WALDROP	601-634-7161	LMVD/LMK
TIM YEH	213-894-5378	SPD/SPL
PAUL KOMOROSKE	415-556-3108	SPD
D. J. ANDERSON	916-551-1892	SPD/SPK
BOB THURING	509-522-6730	NPD/NPW
ERNIE SABO	206-764-3705	NPD/NPS
LARRY MAGURA	503-221-6099	NPD/NPP
MERVIN MULLINS	907-753-2515	NPD/NPA

WORKSHOP ON EXPEDIENT FLOOD FIGHT STRUCTURES AND TECHNIQUES

NEW ORLEANS, LOUISIANA

DECEMBER 9 - 11, 1986

NAME	TELEPHONE #	DIVISION
COL. Jim LYLES	202 - 272 - 0196	DAEN-CWO-
BILL DOAN	402 - 221 - 4585	MRD/MRO
BOB FLORENCE	816 - 374 - 6135	MRD / MRK
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LARRY MORRISON	304 - 529 - 5284	ORD / ORH
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JAMES MOORE	717 - 894 - 7052	NAD / NAB
JOHN HARTMANN	212 - 264 - 0162	NAD / NAN
JOHN DIOGUARDI	212 - 264 - 7091	NAD /
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ERIC RUSSEK	409 - 766 - 3186	SWD / SWG
PHIL BOAWN	505 - 766 - 2607	SWD / SWA

DECEMBER 9 - 11, 1986

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## **APPENDIX C: PRESENTATION OUTLINES**

### **EXPEDIENT FLOODFIGHT TECHNIQUES**

#### **SACRAMENTO DISTRICT BRIEFING**

December 1986

1. Flood of '86 Orientation (Video) - 10 minutes
2. Various Methods Used (slides) - 10 minutes
  - a. Dirt Diking
  - b. Precast Concrete Barrier
  - c. Sandbags
  - d. Rip-rap
  - e. Combination



# EXPEDIENT FLOOD FIGHT STRUCTURES AND TECHNIQUES

ADVANCE MEASURES, GREAT LAKES, 1985 - 86

NORTH CENTRAL DIVISION

Tim Monteen, Chief, Emergency Management Division

## 1. INTRODUCTION.

- A. To Provide an Overview of the North Central Division's Advance Measures Program on the Great Lakes
- B. To Address Specific Temporary Flood Control Structures Utilized to Prevent Flooding Along Shoreline Communities

## 11. ADVANCE MEASURES UNDER PL 84-99.

### A. DEFINITION.

- 1. Prior to Flood Event.
- 2. To Protect Against Loss of Life or Major Damage to Improved Property.

### B. APPLICATION.

- 1. Record High Great Lakes Water Levels in 1985 and 1986.
- 2. Flooding From Storm Induced Wave Set-Up.

### C. MAGNITUDE.

- 1. Detroit District Projects - \$5.6 Million
- 2. Buffalo District Projects - \$6.1 Million
- 3. Chicago District Projects - \$1.3 Million  
\$13.0 Million

### D. TYPES OF STRUCTURAL SOLUTIONS.

- 1. Crib Structures (Government Furnished Materials).
  - (a) Description of Sand Filled Crib.
  - (b) Description of Rock Filled Crib.
- 2. Clay Dikes Structures.
  - (a) Description of Clay Dike.
  - (b) Description of Clay Dike with Riprap.

### E. SELF-HELP PROGRAM.

- 1. Sandbag Dikes.

## FLOOD FIGHT MODEL DEMONSTRATION

### Vicksburg District

#### I. Evolution of the Model

- A. Doing things the old way
- B. Savings - Manpower/Vehicle/\$
- C. Building the Model

#### II. Using the Model Demonstration for:

- A. Education
- B. Public Awareness
- C. Interagency Coordination
- D. Good Press

#### III. Lessons Learned

- A. Fresnel Lens vs. Larger TV
- B. Lightweight Tables
- C. Storage/Transportation
- D. Prior Arrangements for Space
- E. Proper Positioning
- F. Length of Video Presentation

END

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